

Appl. No. 09/903,122
Amendment dated January 27, 2005
Reply to Office action of August 27, 2004

IN THE CLAIMS

1. (Currently amended) A method of calculating the duration a target area is included within an image stream obtained by an image capture system at a physical site, the method comprising:

analyzing at least one field of the image stream for inclusion of the target area, wherein the target area corresponds to a virtual surface defined in a computer model of the site, for which there is no physical counterpart at the site; and

automatically incrementing a counter upon confirmation that the target area is included within the at least one field.

2. (Original) The method according to claim 1, further comprising calculating an occlusion parameter of the target area.

3. (Original) The method according to claim 1, wherein a fee is calculated in response to the counter.

4. (Original) The method according to claim 2, wherein the occlusion parameter is calculated in response to a pixel count of an occlusion of the target area and a pixel count of the target area.

5. (Original) The method according to claim 4, wherein the occlusion parameter is a ratio of the pixel count of the occlusion to the pixel count of the target area.

6. (Currently amended) The method according to claim 2, wherein the counter is incremented by the increment ~~the increment is the~~ numerical result of the occlusion parameter subtracted from one.

7. (Original) The method according to claim 1, further comprising calculating a foreground parameter of the target area.

8. (Currently amended) A method of calculating the duration a target area is included within an image stream obtained by an image capture system, the method comprising:
analyzing at least one field of the image stream for inclusion of the target area;

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automatically incrementing a counter upon confirmation that the target area is included within the at least one field;

~~The method according to claim 7,~~ wherein the foreground parameter is calculated in response to a pixel count of the target area and a pixel count of the at least one field.

9. (Original) The method according to claim 8, wherein the foreground parameter is a ratio of the pixel count of the target area to the pixel count of the at least one field.

10. (Currently amended) The method according to claim 7, wherein the counter is incremented by an increment that is equivalent to the calculated value of the foreground parameter.

11. (Original) The method according to claim 2, further comprising defining an occlusion threshold, an increment to the counter being disallowed if the occlusion threshold exceeds the occlusion parameter.

12. Cancelled.

13. (Original) The method according to claim 1, further comprising:
assigning image data for insertion into the target area; and
reassigning the image data to a second target area to be included in the image stream.

14. (Original) The method according to claim 13, wherein reassigning the image data to a second target area further comprises reassigning the image data to the second target area as the image stream is captured.

15. (Original) The method according to claim 13, further comprising:
specifying a duration the image data is to be included within the image stream prior to capture of the image stream; and

collecting, prior to reassigning the image data, statistical data indicative of the duration that at least one of the group consisting of the target area and the second target area is included in the image stream as the image stream is captured.

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16. (Currently amended) A method of calculating the duration a target area is included within an image stream obtained by an image capture system, the method comprising:
analyzing at least one field of the image stream for inclusion of the target area;
automatically incrementing a counter upon confirmation that the target area is included within the at least one field;
assigning image data for insertion into the target area;
specifying a duration the image data is to be included within the image stream prior to capture of the image stream;
reassigning the image data to a second target area to be included in the image stream; and
collecting, prior to reassigning the image data, statistical data indicative of the duration that at least one of the group consisting of the target area and the second target area is included in the image stream as the image stream is captured;

~~The method according to claim 15,~~ wherein reassigning the image data to a second target area further comprises reassigning the image data to the second target area in response to the statistical data indicating the second target area has a higher duration of inclusion in the image stream than the target area.

17. (Original) The method according to claim 13, further comprising calculating the duration the image data is included in the image stream by summing respective increments to the counter that is associated with the first target area with increments to a second counter that is associated with the second target area, the increments summed limited to respective increments made to the target area when the image data is respectively assigned to one or more of the target area and the second target area.

18. (Currently amended) A system for calculating the duration a target area is included in an image stream of a physical site, the system comprising:

a model of a target area from a site from which the image stream is captured, the target area being virtually defined by the model and not corresponding to a physical element at the site;

a duration calculation module that identifies inclusion of the target area in the at least one field of the image stream, the module including a counter that is incremented upon confirmation of inclusion of the target area within the at least one field, and

wherein the target area is included in the at least one field when the site is included in the image stream.

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19. (Original) The system according to claim 18, further comprising:
image insertion system for inserting a target image into at least one of the plurality of fields of the image stream, the image insertion system in communication with the duration calculation module; and
an image capture system for providing an image to the image measurement system, the image supply system in communication with the image insertion system.

20. (Original) The system according to claim 18, wherein the duration calculation module is included within the image insertion system.

21. (Original) The system according to claim 18, wherein the image measurement system further comprises:

a model renderer for generating a synthetic image based on a predefined three-dimensional reference model of a target area within a site from a known position of a camera included in the image supply system, the synthetic image having the target image inserted in the target area thereof;

an image separator for masking from a video image contained within a frame of a video signal generated by the camera, the target area to create a masked background image, a masked reference image being created by the image separator by separating a reference image from the remainder of the image; and

an occlusion separator operable to compare the masked target area image to the masked reference image, the difference therebetween representing an occlusion of the target image.

22. (Original) The system according to claim 21, wherein the module calculates an occlusion parameter from information obtained from the image separator.

23. (Original) The system according to claim 22, wherein the occlusion parameter is calculated as a ratio of a pixel count of the occlusion to a pixel count of the target image.

24. (Currently amended) The system according to claim 22, wherein the incrementation of the counter is a function of the occlusion parameter.

25. (Original) The system according to claim 21, wherein the module calculates a foreground parameter from information obtained from the image insertion system.

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26. (Original) The system according to claim 24, further comprising an image combiner for producing a final image from the masked background image and the occlusion, the module obtaining a pixel count of the target area from the image separator and a pixel count of the final image from the image combiner, the foreground parameter being calculated from the pixel count of the target area and the pixel count of the final image.

27. (Original) The system according to claim 24, wherein the incrementation is a function of the foreground parameter.

28. (Original) The system according to claim 21, wherein an increment to the counter is disallowed in the event the occlusion parameter exceeds an occlusion threshold.

29. (Original) The system according to claim 21, wherein the target area comprises image data selected from the group consisting of signage existing in a site from which the image stream was captured and synthetic images not present in the site.

30. (Original) The system according to claim 21, further comprising
a model of a target area from a second site from which the image stream is captured; and
a duration calculation module that identifies inclusion of the target area from the second site in the at least one field of the image stream, the module including a counter that is incremented upon confirmation of inclusion of the target area within the at least one field, and wherein the target area from the second site is included in the at least one field when the second site is included in the image stream.

31. (New) Apparatus for determining a parameter representative of the presence and duration of a target area included in a stream of images taken of a physical site by a camera, the system comprising:

a module for identifying the target area within the image stream, the module identifying the target with reference to a three-dimensional, computer model of the physical site, the target area within a physical site and the camera's position relative to the site, wherein the computer model of the physical site is constitutes less than a complete model of all of the surfaces within the site;

a module for tracking a length of time that the target area is within the image stream;

a module for determining foreground occlusion of the target area when present in the image stream, and

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a module for determining the parameter based on the amount of time the target is within the image stream and the foreground occlusion of the target area.

32. (New) The apparatus of claim 31, wherein the target area corresponds to a virtual surface defined in the 3-dimensional model, for which there is no corresponding physical element at the site.